

The Impact of Venture Capital Reputation on Portfolio Company Post-IPO Performance under Economic Uncertainty

Bachelor's Thesis

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5.12.2016

Abstract

I study the interaction of venture capital reputation and stock market volatility, and their relation together on portfolio company post-initial public offering long-run performance in the US 1990-2015. Krishnan et. al. (2011) have shown that venture capital reputation, which is acquired by successful past venture activity, has a positive significant relation to several long-run post-IPO performance measures of portfolio companies in the US. My findings indicate that VC reputation predicts post-IPO performance only during volatile performance years.

Contents

1. Introduction	2
2. Data, sample and variable construction	4
2.1. VC backed IPO sample construction	4
2.2. Post-IPO long-run performance measure	4
2.3. VC reputation measure	5
2.4. Uncertainty dummy	6
2.5. Interaction variable: VC reputation and uncertainty dummy	6
2.6. Control variables	6
2.7. Descriptive statistics	7
3. Methods and results	10
3.1. Multiple regression	10
3.2. Robustness analysis	12
4. Conclusion	13
References	15

1. Introduction

The influence of venture capitalist firms (VCs) as backing¹ entities of companies doing initial public offerings (IPOs) has been proven to be beneficial both in decreasing information asymmetry in the offerings (Megginson & Weiss, 1991) and boosting portfolio company post-IPO performance (Brav & Gompers, 1997). Further studies have proven that it is not any kind of a venture capitalist who provides superior post-IPO performance, but rather the more reputable ones (Nahata, 2008 and Krishnan et al., 2011). Yet to be assessed is how the value creation of VCs depend on economic environment.

Krishnan et. al. (2011) study the relation between VC reputation, measured with past IPO market share, and portfolio company long-run performance. IPO market share is a legitimate measure because it captures each VC's past IPO success and allows comparison to the rest of the VCs. IPOs are not only the most profitable exit method for VCs, but also the most visible one for the rest of the market. Brau et al. (2003) report a 22 % premium for owners looking for an exit over an IPO rather than takeover. Cumming and MacIntosh (2003) find IPOs to be significantly more profitable way of partial exit² compared to acquisition, the average annual rates of return to VCs being 84% for IPOs and 20% for acquisitions.

Krishnan et. al. (2011) measure reputation by past 3-year IPO market share of a VC. Similar reputation measures have been used also in studies regarding other types of financial intermediaries, such as investment banks (see Megginson & Weiss, 1991). After controlling for VC involvement, selection of portfolio companies and corporate governance, they conclude that the superior post-IPO performance is due to lead VCs³ retaining their investments in their portfolio companies 3 years after the IPO, contrary to the behaviour of the rest of syndicate members⁴. In other words, the lead VCs continue to

¹ VC backed company is a private company that has been financed by venture capital (Cambridge Dictionary, 2016).

² Partial exit is a liquidation of a part of a holding (London South East, 2016).

³ Lead VC is the VC that has the largest share of capital in a syndicated financing arrangement. Lead VC is often the initiating VC and usually takes charge of the deal on behalf of the other syndicate members. (BusinessDictionary, 2016)

⁴ VC syndicate is a temporary arrangement of multiple VCs investing in same company, the lead VC takes the charge and the rest of the syndicate member provide capital (Businessdictionary, 2016).

provide monitoring services as blockholders, i.e. large shareholders, after the IPO and this contributes to the superior performance of the portfolio companies. This is supported by empirical evidence that large blockholders improve firm performance (Cronqvist & Fahlenbrach, 2009). Jain and Kini (1994) report that IPO firms, whose equity owners retain their investments in the firm, perform better post-IPO compared to those firms, whose owners take the exit.

I am going to continue examining VC reputation as a predictor for long-run post-IPO performance. The goal of this study is to deepen the understanding of the effect of reputation by examining how does the importance of it vary relative to the prevailing economic uncertainty, which is measured by stock market volatility. Stock market volatility can be seen as a proxy for economic uncertainty (Bloom, 2014), thus it measures the stability of economic environment the portfolio companies face.

My hypothesis is that during greater economic uncertainty, monitoring services offered by blockholder VCs, and thus the reputation measure presented by Krishnan et. al. (2011), should have greater impact on performance. I am going to replicate Krishnan et. al. (2011) and add the volatility aspect to the model. I will study my hypothesis by conducting a multiple regression analysis and expect to see the coefficient of VC reputation to move over to the term where the volatility is addressed.

I address the prevailing economic uncertainty by using Volatility Index (VIX) of Chicago Board Options Exchange, calculated from the S&P500 stock index option prices. It measures the market expectations of near-term volatility (CBOE, 2016). I define a year uncertain, when its average annual VIX exceeds the annual sample average VIX.

I find that IPO market share, as a measure of VC reputation, has significant positive relation to post-IPO long-run performance only when the performance years have been uncertain. A 1% gain of market share increases the long-run market-to-book ratio by 0.43 during uncertain years, and decreases it by 0.12 during more stable years. The results are in line with Krishnan et. al. (2011), excluding the fact that they have not accounted for volatility in their analysis. Though, it is not yet fair to conclude that they would have omitted variable bias in their model. My model would have to be identically specified

compared to theirs, which has not been possible due to limited resources and scope of bachelor's thesis.

The rest of the paper proceeds as follows. Section 2 describes my data and sample gathering process, variable construction and provides descriptive statistics. Section 3 presents methodology I use and discusses results. Section 4 concludes.

2. Data, sample and variable construction

2.1. VC backed IPO sample construction

My initial sample consists of US venture capital backed IPOs between 1990-2015. IPO issue characteristics, IPO backing VCs and VC investment characteristics come from Thomson Financial's Securities Data Corporation (SDC) Platinum Global New Issues database. IPO issuers' financial fundamental data and CBOE Volatility Index (VIX) come from Wharton Research Data Services (WRDS) Compustat database and stock prices and share data from WRDS Centre for Research in Security Prices (CRSP) database. (Krishnan et. al., 2011)

I exclude IPOs not listed in one of the three major US exchanges, IPOs of financial intermediaries and real estate investment trusts, IPOs of which proceeds are below 5 million USD or price per share below 5 USD, IPOs that got their first VC investment after going public, IPOs that have unidentified VC as a lead investor and all IPOs which are missing identification or other data items. (Krishnan et. al., 2011)

Next I will describe the variables used in the regression analysis, starting from the dependent performance variable and continuing with the independent explanatory variables and control variables, and finally presenting the descriptive statistics of the final sample.

2.2. Post-IPO long-run performance measure

My long-run performance measure is issuer market-to-book ratio, at the end of 12th quarter after an IPO, or the last quarter data is available to avoid including survivorship bias into my analysis. Market-to-book ratio captures the market valuation relative to the

issuer book value of equity. I winsorize the issuer market-to-book ratios on 1% and 99% level because I find that the outliers are driving my results.

Krishnan et. al. (2011) run 4 multiple regressions for different performance measures, which are market-to-book ratio, match-adjusted return on assets, survival index and abnormal stock returns. Because of the narrow scope of bachelor's thesis, I decide to run multiple regression on one performance measure and make it as robust and well specified as possible instead of multiple less robust regressions. I do not find a reason to believe that the relation between the impact of VC reputation and volatility would not exist in other performance measures, thus this limitation should not impact the quality of my analysis.

2.3. VC reputation measure

VC reputation measure, IPO market share, is calculated by dividing the dollar amount of IPOs a VC has been backing by the dollar amount of whole VC backed IPO market size during each year. It is calculated 3 years preceding an IPO. By using information available at the beginning of an IPO under analysis, I avoid including look-ahead bias into the reputation measure and also keep the measure recent. (Krishnan et. al., 2011)

For example, if 10 companies, who all had at least one VC backing them, did an IPO size of \$10 million each during a certain year, the market size would have been \$100 million. Now if a VC firm A had invested in 3 of these, VC firm B in 2 and VC firm C in 6, their IPO Market Shares would have been 30%, 20% and 60%, respectively. Every syndicate member receives a full credit for each completed IPO, when the VC specific IPO market shares are calculated. When regressing the measures on performance though, only the lead VCs of each IPO are taken into account, because they are responsible for the monitoring and also tend to retain their investments in their portfolio companies 3 years after an IPO, as mentioned in the Section 1. In case of multiple leads, I equally weight their IPO market shares. (Krishnan et. al., 2011)

It is worth to point out, that the IPO market share is not a traditional market share measure in a sense that the sum of every VCs IPO market share does not equal 100%, but rather exceeds it. This is because of the built in feature of crediting every syndicate member fully for each IPO it has been backing preceding the offering. Theoretically this allows

every VC to gain full 100% market share, if every VC was backing every IPO during a certain year.

The median and mean IPO market share for the whole VC backed IPO market, are 1.3% and 2.6%, which suggests that there is some variance in the data, but outliers should not be a serious problem. Note that the VC market is highly fragmented, and there is only 33 lead VCs exceeding average IPO market share of 5% in my sample.

2.4. Uncertainty dummy

I calculate the dummy using VIX. The dummy receives a value of 1 when the average annual VIX of the 3 post-IPO performance years is above the annual average of the whole sample, and otherwise value of 0.

Graham and Harvey (2013) finds strong positive correlation between the long-term equity risk premium and VIX. Their findings are concise with my use of VIX. The increased risk premium tells about market's increased uncertainty about prevailing market conditions.

2.5. Interaction variable: VC reputation and uncertainty dummy

This is my variable of interest I hypothesize to receive positive significant coefficient greater than the coefficient of plain IPO market share term. It will capture the effect of IPO market share to market-to-book ratio when the uncertainty dummy receives a value of 1. The effect during more stable years will be visible in the plain IPO market share term.

2.6. Control variables

Following Krishnan et. al. (2011), I add several control variables to make sure that I do not include the effect of known issuer or issue characteristics, that will drive the performance, into IPO market share or interaction measure. I.e. not to include any observable sample heterogeneity into my model. The controls are defined as follows.

(i) Natural logarithm of the offer size, which is defined as gross proceeds of an IPO, overallocments excluded. It is often argued that the bigger offerings are done by more

established firms that are also financially stronger (Carter et. al., 1998). This variable will pick any systematic effect of the offering size.

(ii) Issuer market capitalization, measured by multiplying the offer price by the total number of shares outstanding after the offer (Brav & Gompers, 1997).

(iii) Issuer market-to-book ratio at the IPO date, which is a common measure for firm growth opportunities (Brav & Gompers, 1997). It is also my performance measure, so it makes sense to control it at the beginning of the performance time period.

(iv) The first day raw stock return of the issue, also known as underpricing (Welch, 1989). It is run on 579 observations, as all the controls above.

(v) Natural logarithm of $1 + \text{issuer age in years}$, calculated from the foundation date to the IPO date. The age can be seen as a proxy for the riskiness of the firm, older firms being less risky (Ritter, 1991). It is run with 339 observations in a separate regression including all the variables described above.

(vi) Price revision, which is defined as final offer price divided by middle of the high and low prices of the initial filing. It measures the increase of offer price from the estimated middle price presented in prospectus, thus it measures the demand of an issue (Hanley, 1993). It is run with 99 observations in the third regression including all the variables described above.

(vii) Vectors for year and industry fixed effects, which receive a value of 1 when the industry or IPO year is same as the issuer's, and zero every other time. The purpose of the vectors is to extract the fixed effects of performance that all the IPOs completed during certain year or in certain industry have acquired due to macroeconomic conditions.

2.7. Descriptive statistics

I start the sample and variable construction by taking into account all the completed VC backed IPOs in the US during 1990-2015. After doing necessary data trimming, based on the criteria presented at the beginning of the Section 2.1, I am left with 1309 VC backed IPOs and 1838 backing VCs.

I proceed by calculating the initial VC reputation measure for each of those VCs at the beginning of 1993, which is the first IPO year of which issuer long-run performance I am

analysing. The initial VC reputation measure is thus calculated from the years 1990-1992, by aggregating the gross proceeds of each IPO a VC has been backing during these years and divided by the aggregated 3-year market size of the whole VC backed IPO market. The VC reputation is continuously being measured as a 3-year rolling market share, preceding the IPO year under analysis, from here on. (Krishnan et. al., 2011)

Due to initial reputation measure time period 1990-1992 and the 3-year performance time period 2013-2015 of the last IPO year under analysis, the IPOs, of which performance I am measuring, have been completed between 1993-2012 and include 1021 observations. After assessing market-to-book ratios and necessary control variables to each IPO, I am left with 578 observations, which is my final sample. As described in the Section 2.6 though, I do run 2 additional regressions with smaller sample sizes adding a few more control variables to increase the extensiveness of my analysis and make sure the results are robust.

Yearly frequencies of VC backed IPOs, as well as annualized VIX scores, are presented in the Panel A of Table 1. The uncertainty of economy has been cyclical, as can be seen from the table, years 1993-1996 and 2003-2006 the VIX is below the sample average, 1997-2002 above it and so on.

Mean IPO characteristics, which are controlled in the regression, are presented in the Panel B of Table 1. I compare the characteristics between two groups I call Reputable Leads, which includes the IPOs backed by lead VCs whose average IPO market share exceeds the sample median, and Non-Reputable ones the other way around. Reputable Leads seems to have bigger, younger and more demanded IPOs, of which underpricing is significantly lower than the Non-Reputable one's. This is in line with the earlier VC backed IPO literature.

Long-run performance measure, market-to-book, is presented in the Panel C of Table 1. It is also substantially higher than Non-Reputable Leads' corresponding figure, this is in line with Krishnan et. al. (2011) findings about significant positive relation of VC reputation and long-run performance.

It would be beneficial to confirm and discuss the lead VC's holdings in their portfolio companies after the IPO, but unfortunately the scope of bachelor's thesis does not allow

Table 1

Descriptive Statistics of IPO Sample

Panel A reports the distribution of my IPO sample to years under analysis, 1993-2012, and also the annualized VIX of each IPO year. Panel B continues with mean IPO characteristics and divides the IPO sample into two groups: IPOs backed by reputable leads, defined as lead VC(s) whose average IPO market share exceed the median of the whole VC sample, and IPOs backed by non-reputable leads which, in turn, are those that fall below the median. Panel C reports the long-run performance measure, market-to-book ratio, in similar fashion. The means between two groups have been tested for statistical differences, which have been reported with stars *, ** and ***, implying significance on levels 10%, 5% and 1%, respectively. N denotes the number of observations analysed.

Panel A: Number of VC backed IPOs and annualized VIX per year

	VC Backed IPOs N = 578	Annualized VIX $\overline{VIX} = 18.1$
1993	37	12.7
1994	45	14.0
1995	45	12.4
1996	82	16.4
1997	44	22.4
1998	29	25.6
1999	70	24.4
2000	59	23.3
2001	11	25.7
2002	10	27.3
2003	10	16.8
2004	28	15.5
2005	15	12.8
2006	21	12.8
2007	31	17.5
2008	4	32.7
2009	4	31.5
2010	13	22.5
2011	7	24.2
2012	13	17.8

Panel B: Mean IPO characteristics

	All VC Backed IPOs N=578	Reputable Lead(s) N=210	Non-Reputable Lead(s) N=368
Offer size (\$ million)	90.5	129.7	68.2
Market cap (\$ million)	435.4	633.0	322.6
Issuers M/B (IPO date)	3.9	3.8	4.0
Underpricing (%)	28.4	23.3*	31.4*
Issuer age (years) ⁵	8.5	8	8.7
Price revision (%) ⁶	1.7	5.6***	-0.8***

Panel C: Following 3 year post-IPO performance

	All VC Backed IPOs N=578	Reputable Lead(s) N=210	Non-Reputable Lead(s) N=368
Issuer M/B (12 th quarter after IPO)	6.8	8.4	5.9

⁵ Sample size decreases, N=339, N=118, N=221 respectively

⁶ Sample size decreases, N=99, N=40, N=59 respectively

me to do that. Krishnan et. al. (2011) find that in their sample, US IPOs 1993-2004, lead VCs remain as blockholders in 97% of their portfolio companies at the time of the initial public offering, and 91%, 76% and 67% after 1, 2 and 3 years of the IPO, respectively. I do not find any reason to believe that this effect would not appear also in my sample, especially because it is a phenomenon that has been reported in other contexts as well (see Barry et. al., 1990; Megginson & Weiss, 1991; Lin & Smith, 1998).

3. Methods and results

3.1. Multiple regression

I use a linear multiple regression to assess the relations between performance, reputation and volatility. I regress issuer market-to-book ratio to variables described in the Section 2. The monitoring and development services offered by the Lead VCs, should manifest themselves in the coefficient of my interaction variable *IPO Market Share * Volatility Dummy*. The model is specified as follows:

$$\begin{aligned} MB = & \beta_Y + \beta_I + \beta_1 \text{IPO Market Share} + \beta_2 \text{Volatility Dummy} \\ & + \beta_3 \text{IPO Market Share} * \text{Volatility Dummy} + \beta_4 \text{Ln Offer Size} \quad (1) \\ & + \beta_5 \text{Issuer Market Cap} + \beta_6 \text{Issuer MB} + \beta_7 \text{Underpricing} + \varepsilon \end{aligned}$$

where β_Y is a vector of 1 and 0s for year fixed effects and β_I is a vector of 1 and 0s for industry fixed effects. The year fixed effects are controlled by the IPO year and the industry fixed effects by issuer 2-digit SIC codes.

The results are presented in the Table 2, which includes coefficient estimates, and t-statistics in parentheses. The standard errors, used to estimate the coefficients and t-statistics, are industry clustered⁷ by 2-digit SIC codes and robust to heteroscedasticity⁸. IPO market share continues to have significant effect, of which economic significance is in line with Krishnan et. al. (2011). This is a sanity check that increases my confidence in

⁷ The standard errors might differ across industries, so they need to be clustered (Petersen, 2009).

⁸ Cluster robust standard errors are also robust to heteroscedasticity (Cameron & Miller, 2013).

Table 2

Issuer Long-run post-IPO Performance, VC Reputation and Uncertainty

Table 2 presents OLS multiple regression estimated coefficients and t-statistics in parentheses. Standard errors used to estimate these two, are industry clustered by 2-digit SICs and robust to heteroscedasticity. Issuer market-to-book at the end of 12th quarter after the IPO, or the last quarter available, is regressed on Lead VC IPO market share, which is calculated as a Lead VC market share 3 IPO preceding calendar years, Volatility Dummy, which receives a value of 1 when the annual VIX exceeds the annual sample average VIX and otherwise 0, the interaction variable IPO Market Share * Volatility Dummy, and a set of control variables. The equation below presents the base case regression, with 578 IPOs between 1993-2012. 2 additional regressions have been run with supplemental control variables that also decrease the amount of observations, coefficients and t-statistics are reported in the 2 remaining columns. Adjusted R² values have been reported for each regression at the bottom of the table. N denotes the number of observations.

$$MB = \beta_Y + \beta_I + \beta_1 \text{IPO Market Share} + \beta_2 \text{Volatility Dummy} + \beta_3 \text{IPO Market Share} * \text{Volatility Dummy} \\ + \beta_4 \text{Ln Offer Size} + \beta_5 \text{Issuer Market Cap} + \beta_6 \text{Issuer MB IPO Date} + \beta_7 \text{Underpricing} \\ + \varepsilon$$

It is important to note, that the total effect of IPO Market Share manifests itself in the coefficients of both IPO Market Share and IPO Market Share * Volatility Dummy, and is conditional to year uncertainty status the dummy receives.

Significance levels reported as: * = 10%, ** = 5%, *** = 1%

	Dependent variable, 3 different model specifications		
	M/B N = 578	M/B N = 339	M/B N = 99
IPO Market Share	-0.12 (-0.9)	-0.09 (-1.2)	-0.50 (-1.5)
Volatility Dummy	-4.07 (-1.5)	-4.72* (-1.7)	-7.4 (-1.4)
IPO Market Share*Volatility Dummy	0.55** (2.5)	0.82 (1.6)	0.64 (1.1)
Ln Offer Size	-0.48 (-0.2)	2.52 (1.4)	-0.84 (-0.3)
Issuer Market Cap	0.00 (0.5)	-0.00 (-1.3)	-0.01 (-1.3)
Issuer M/B IPO Date	0.04 (0.7)	0.05 (0.7)	0.32 (1.2)
Underpricing	1.40* (1.7)	2.33 (1.5)	9.03 (1.5)
Ln Issuer Age		-1.78 (-0.7)	-1.59 (-0.9)
Price Revision			-0.02 (-0.0)
Adjusted R ²	8.4%	12.1%	-26.6%

the model as a whole. Furthermore, the effect of IPO market share has transformed entirely into the interaction variable *IPO Market Share * Volatility Dummy*, so indeed looks like the VC reputation would matter only during economically uncertain years, as hypothesized.

I measure the economic significance of VC reputation by marginal effect of IPO market share (IMS) to the performance measure, market-to-book ratio.

$$\frac{dMB}{dIMS} = \beta_1, \text{ when Volatility Dummy} = 0 \quad (1.1)$$

$$\frac{dMB}{dIMS} = \beta_1 + \beta_2, \text{ when Volatility Dummy} = 1 \quad (1.2)$$

As can be seen from Table 2, increase of 1% in the IPO market share of the Lead VC(s) actually decreases portfolio companies market-to-book ratio by -0.12 in the long-run, after the IPO, during relatively stable years. On the other hand, during economically uncertain years the effect is opposite, increasing the market-to-book ratio by 0.43. Additionally, 1-standard-deviation increase in the IPO market share during uncertain years, in turn, increases market-to-book ratio by 3.1. IPO market share of the Lead VCs has both a clear economic and statistical significance as an issuer long-run post-IPO performance predictor and this has clear implications for VCs how to allocate monitoring resources during economic cycles.

The following 2 regressions with supplemental control variables *issuer age* and *price revision* have similar implications on IPO market share both during stable and uncertain years. These regressions do not yield any significant results, but confirms that the effect of VC reputation stays positive and relatively stable even when these variables are controlled. Every regression has a relatively low Adjusted R^2 , but they are in line with Krishnan et. al. (2011), who report Adjusted R^2 s of 5-12%.

3.2. Robustness analysis

I start by sanity checking my sample, which is from longer time period than in Krishnan et. al. (2011), by running a fully replicated regression without the uncertainty dummy nor interaction variable. I find in untabulated results statistically significant positive relation with VC reputation and post-IPO performance, which do not differ from the reference authors' relation. This confirms that the variables are calculated correctly and that the

relation between VC reputation and post-IPO performance exists also on longer time period than 1993-2004.

I run all the 3 model specifications without winsorizing the market-to-book ratio, and find in untabulated results that the significance I had disappears but the interpretation of coefficients stay the same. Coefficient of IPO market share * uncertainty dummy increases to 1.24 due to massive 896 market-to-book ratio of Amazon. It is important to winsorize at the 1% and 99% level, because this magnitude market-to-book ratio cannot be continuously expected and thus the model will not represent real world with unwinsorized data.

I also run all the 3 models without clustering standard errors, but do correct the heteroscedasticity observed in the model. This does not affect coefficients at all, but do lower the t-stats, still keeping the coefficient of *IPO Market Share * Uncertainty Dummy* significant on a 5% level.

I make sure that the VCs under analysis have invested into the portfolio company prior the IPO, and do find couple of cases where the initial investment has occurred afterwards. I delete these observations.

As discussed earlier, it would be beneficial to run the regressions for the other performance measures as well, as Krishnan et. al. (2011) does. It would make the results reported in this thesis more extensive and would increase the robustness even more. This is something that should be done in future research, on top of controlling for VC involvement, selection of portfolio companies and corporate governance.

4. Conclusion

I examine the VC reputation, volatility and their interactive effect on portfolio company post-IPO long-run performance 1990-2015 in the highly fragmented US venture capital market, where VC reputation is important determinant of the portfolio companies post-IPO performance (Krishnan et. al., 2011). The previous literature has focused on examining the effect of VC reputation evenly through time, I, in turn, focus on whether the importance of VC reputation differs when the economic uncertainty is greater than on average.

I find that VC reputation matters only during uncertain years, which I defined more volatile than average year is. As the VC reputation measure is acknowledged as a proxy for VC monitoring and development services offered to portfolio companies, it is important to note that this result has clear implications of how to allocate the monitoring resources through different economic cycles.

Future studies on the subject should focus on controlling various different factors that were out of the scope of bachelor's thesis. These factors include VC involvement, selection of portfolio companies, corporate governance and Lead VC holdings after the IPO under analysis. It would also be necessary to estimate the models for several different performance measures. This all would add to the robustness and extensiveness of the results I present in this thesis.

References

- Barry, C. B. and Muscarella, C. J. and Peavy III, J. W., and Vetsuypens, M. R., 1990. The role of venture capital in the role of creating public companies, *Journal of Financial Economics* 27, 447-471.
- Bloom, N., 2014. Fluctuations in uncertainty, *Journal of Economic Perspectives*, 28/2. 153-176.
- Brau, J. C. and Francis, B. and Kohers, N., 2003. The choice of IPO versus takeover: Empirical evidence, *Journal of Business* 76/4, 583-612.
- Brav, A. and Gompers, P. A., 1997. Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and nonventure capital-backed companies, *The Journal of Finance*, 52/5, 1791-1821.
- BusinessDictionary, 2016. <http://www.businessdictionary.com/definition/lead-investor.html> (3.12.2016).
- Cambridge Dictionary, 2016. <http://dictionary.cambridge.org/dictionary/english/venture-backed> (3.12.2016).
- Cameron, A. C. and Miller, D. L., 2013. A practitioner's guide to cluster robust inference, *The Journal of Human Resources* 50/2, 317-372.
- Carter, R. B. and Dark, F. H. and Singh, A. K., 1998. Underwrite reputation, initial returns, and the long-run performance of IPO stocks, *The Journal of Finance* 53/1, 285-312.
- Chicago Board Options Exchange, 2016. <http://www.cboe.com/micro/vix/vixintro.aspx> (12.11.2016).
- Cumming, D. J. and MacIntosh, J. G., 2003. A cross-country comparison of full and partial venture capital exits, *Journal of Banking & Finance*, 27. 511-548.
- Cronqvist, H. and Fahlenbrach, R., 2009. Large shareholders and corporate policies, *The Review of Financial Studies* 22/10, 3941-3976.
- Graham, J. R., Harvey, C. R., 2013. The equity risk premium, SSRN, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2206538 (12.11.2016).

Hanley, K. W., 1993. The underpricing of initial public offerings and the partial adjustment phenomenon, *Journal of Financial Economics* 34, 231-250.

Jain, B. A. and Kini, O., 1994. The post-issue operating performance of IPO firms, *The Journal of Finance* 49/5, 1699-1726.

Krishnan, C. N. V. and Ivanov, V. I. and Masulis, R. W. and Singh, A. K., 2011. Venture capital reputation, post-IPO performance and corporate governance, *Journal of Financial and Quantitative Analysis* 46/5, 1295-1333.

Lin, T. H. and Smith, R. L., 1998. Insider reputation and selling decisions: the unwinding of venture capital investments during equity IPOs, *Journal of Corporate Finance* 4, 241-263.

London South East, 2016.

http://www.lse.co.uk/financeglossary.asp?searchTerm=&iArticleID=2019&definition=partial_exit (4.12.2016)

Meggison, W. L. and Weiss, K. A., 1991. Venture capitalist certification in initial public offerings, *The Journal of Finance*, 46/3, 879-903.

Nahata, R., 2008. Venture capital reputation and investment performance, *Journal of Financial Economics* 90, 127-151

Ritter, J. R., 1991. The long-run performance of initial public offerings, *The Journal of Finance* 46/1, 3-27.

Welch, I. and Teoh, S. H. and Wong, T. J., 1998. Earnings management and the long-run market performance of initial public offerings, *The Journal of Finance* 53/6, 1935-1974.